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BOTANY.—*Roseocactus, a new genus of Cactaceae.* ALWIN BERGER, New York Agricultural Experiment Station, Geneva, N. Y. (Communicated by E. P. KILLIP.)

In 1838 J. Scheidweiler described and figured a curious little cactus collected by Galeotti near San Luis Potosí, Mexico, where it was said to grow on porphyritic rocks at an elevation of 6500 to 7000 feet. This cactus was unlike any of the Cactaceae known at that time. Scheidweiler recognized it as a new genus, so far monotypic, and gave it the name *Ariocarpus*. The generic name alludes to the fruit of the *Aria*, though in the case of this cactus it is a soft berry with many small seeds. The specific name which Scheidweiler gave to the plant, *retusus*, referred to the shape of the tubercles, which, mistaken for leaves, somewhat resemble the leaves of *Haworthia retusa* from South Africa; indeed the whole habit of the plant is similar to this strange little aloid succulent. Scheidweiler did not discuss the relationship of his new genus.

The following year Lemaire described the same plant under the name *Anhalonium prismaticum*. In spite of the fact that this was a later name, it has been more commonly used than Scheidweiler's older one.

In 1842 Lemaire added another plant to his genus *Anhalonium*, *A. kotschoubeyanum*, also from San Luis Potosí, where three specimens of it had been collected by Karwinski. Lemaire, ignored the fact that the Karwinskian plant differed from that of Galeotti in having the tubercles split lengthwise by a deep fissure. In general habit, of course, the two plants were much alike, and in both the flowers came from the center of the plant; the exact origin of the flowers could not apparently be determined without sacrificing the very rare plants.

Later on, in 1850, Prince Salm-Dyck published a description of

another plant, collected by Galeotti, under the name *Anhalonium elongatum*, and Lemaire added *A. areolosum* in 1859 and *A. pulvilligerum* in 1869. These three species, as well as several others, have remained doubtful.

In 1856 G. Engelmann described a new plant of this relationship collected by Schott and Bigelow near the junction of the Pecos and the Rio Grande as *Mammillaria fissurata*. In 1859 he transferred this to the genus *Anhalonium*. Nine years later Lemaire needlessly changed this name to *A. engelmannii*.

Schumann, in 1903, recognized four species of *Ariocarpus*, and Britton and Rose, in their recent excellent monograph of the Cactaceae, admit three species. The different views as to the number of species are not of great importance here; more important is the fact that in these monographs the genus *Ariocarpus* is located in different subtribes. While Schumann placed the genus among the Mammillarieae, Britton and Rose place it with the Echinocactanae. This seems strange but, as it is, they may both be right.

I was never quite satisfied with the conception of the genus as stated by Lemaire and maintained by all subsequent writers. Scheidweiler's plant with the smooth, sharply pointed tubercles, bearing a little round areole with felt and some minute or obsolete spines near the top, is utterly different from the others with cleft tubercles. It was Lemaire who first included them under the same genus, his *Anhalonium* being only another name for the genus *Ariocarpus* of Scheidweiler.

Through the kindness of Dr. J. N. Rose, I was enabled to study various living and dried plants and to compare them with Engelmann's *Mammillaria fissurata* from Texas, cultivated at the New York State Experiment Station. I finally have come to the conclusion that there are indeed two distinct genera, differing not only in the nature of the tubercles but also, and chiefly, in the origin of the flowers.

If we break off an old tubercle of the Texan plant or of *Ariocarpus lloydii* Rose and cut it longitudinally, we shall see that the fissure, filled with grayish hairy wool, corresponds to an areole and we shall discover in its lower part the remains of the fruit and perhaps even a few seeds. On my living plant of *Mammillaria fissurata* Engelm., from Texas, seeds are observed in many of the old areoles. The seeds are more or less exposed and can be easily extracted; evidently in nature they are removed by rainwater. I have shown four of them recently and have three healthy seedlings at present. I do not know how old

these seeds may have been. We see that these plants have one single areole from which arise the flowers; in this character they agree with the subtribe Echinocactanae.

The tiny areole at the top of the tubercles of the true *Ariocarpus* of Scheidweiler is wholly different. It does not show any sign of having ever produced flowers. In fact, if we break off one of the tubercles on a dried specimen, we shall detect in the axil between the tubercles, at the base of the tubercle but rising from the axis, the remains of the old fruit and numerous seeds, which have been hidden there for years.

We see, therefore, that *Ariocarpus*, like *Neomammillaria*, has *two* kinds of areoles, barren ones on the top of the tubercles and others producing flower and fruit situated between the tubercles, or axillary on the stem. There can be no doubt that *Ariocarpus* belongs in the vicinity of *Neomammillaria* in the subtribe Coryphanthanae.

It is evident, now, that the plants hitherto included under *Ariocarpus* not only are very different but may even belong to two subtribes. It may be, however, that this longitudinal flower producing fissure corresponds to the groove on the tubercles of the Coryphanthanae, and that the spine-bearing areole at the top of the tubercle has become obsolete. In this case these plants would be Coryphanthanae and not belong to the Echinocactanae. This question can only be solved by following the development of the plants from the seedlings, which bear spines, to the adult state. At present the exact systematic position must remain doubtful.

The only species which can positively be left in *Ariocarpus* Scheidweiler is *A. retusus*, the type species. Presumably there may be more than one species. Schumann placed the species of *Ariocarpus* proper in the subgenerus *Leiothele* and the two other species, *A. fissuratus* and *A. kotschoubeyanus* in the subgenera *Aegopodothele* and *Chasmatothele*. These latter species form a new genus, for which I herewith propose the name, *Roseocactus*. I take great pleasure in associating with these remarkable plants the name of Dr. J. N. Rose, who has done so much for the exploration of the Mexican flora and especially for the advancement of our knowledge of the Cactaceae, and who has recently published with Dr. N. L. Britton, Director of the New York Botanical Garden, a comprehensive monograph of these plants under the auspices of the Carnegie Institution of Washington.

Roseocactus Berger, gen. nov.

Extremely succulent plants with a thick turnip-like root and a flat or hemispherical body with numerous, densely spirally arranged thick tubercles,

exhibiting only the triangular upper surface of the top, and this rough, wrinkled or variously furrowed and deeply cleft lengthwise; cleft concealing the areole filled with wool and producing the flower and fruit from its lower part, the basal part of the tubercles generally quite hidden, the upper part semiterete or flattened; ovary naked; fruit naked, finally desiccating; seeds roundish obovate, finely rough-punctate, dull black; flowers from very young tubercles in the slightly depressed woolly center of the plant, surrounded by a dense mass of wool, the perianth shortly funnel-shaped, the outer segments few, somewhat fleshy and paler, the inner perianth segments in two rows, oblanceolate, finely dentate and cuspidate, sometimes retuse, spreading when fully developed, usually deeply rose-colored; filaments numerous, erect, somewhat longer than the tube; anthers small, yellow; style overtopping the anthers, with 5 to 9 irregularly spreading stigma lobes.

The flowers open at noon in full sun and are of short duration. The seedlings have minute white bristles in their areoles which disappear entirely on the plants later on.

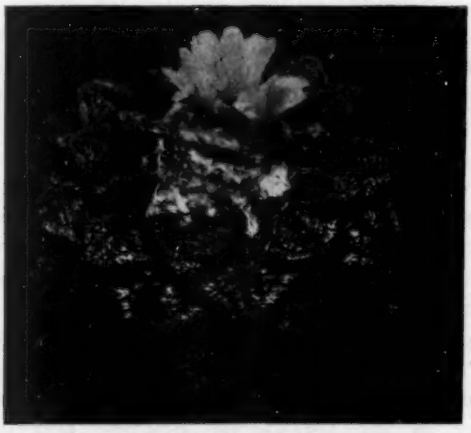

FIG. 1.—ROSEOCACTUS FISSURATUS (ENGELM.) BERGER

Type species: *Mammillaria fissurata* Engelm.

The genus ranges from Central Mexico to Western Texas. It consists of the following species:

Roseocactus fissuratus (Engelm.) Berger

Mammillaria fissurata Engelm. Proc. Amer. Acad. **3**: 270. 1856.
Anhalonium fissuratum Engelm. Cact. Mex. Bound. 75, *pl. 16*. 1859.
Anhalonium engelmannii Lemaire, Cactées 42. 1868.
Ariocarpus fissuratus K. Schumann in Engler and Prantl, Nat. Pflanzenfam. **3**^{6a}: 195. 1894.
Coahuila, and southwestern Texas.

The triangular surface of the tubercles show a deep linear impression following the outer margins of the triangle.

FIG. 2.—ROSEOCACTUS LLOYDII (ROSE) BERGER

"This plant is generally known as living rock. It is dull gray to brown in color and grows on dry stony ground and, when not in flower, is easily mistaken for the rocks which surround it."[1]

Roseocactus lloydii (Rose) Berger

Ariocarpus lloydii Rose, Contr. U. S. Nat. Herb. **13**: 308. *pl. 62.* 1911. Zacatecas.

This species is very distinct from the preceding. In *R. lloydii* the tubercles are without the linear depression along the margin, but are raised towards the longitudinal cleft, almost as if they were compressed. Moreover, the exposed end of the tubercles is broadly rhomboid rather than deltoid. It is of more southern distribution than *R. fissuratus*.

Roseocactus kotschoubeyanus (Lemaire) Berger

Anhalonium kotschoubeyanum Lemaire, Bull. Cercle Confér. Hort. Dép. Seine 1842.
Anhalonium sulcatum Salm-Dyck, Cact. Hort. Dyck. 1849: 5. 1850.
Anhalonium fissipedum Monv. Cat. 1846 ex Labour. Monogr. 154. 1858.
Stromatocarpus kotschubeyi Karw. ex Lem. Ill. Hort. **16**: Misc. 72, 1868, name only.
Ariocarpus sulcatus K. Schumann, Monatschrift. f. Kakteenk. **8**: 9. 1897.
Ariocarpus kotschubeyanus K. Schumann in Engler and Prantl, Nat. Pflanzenfam. Nachtr. 259. 1897.
Central Mexico.

In this, the smallest of the three species, the triangular surface of the small tubercles is slightly rough; the flowers arise just a little below the triangular top of the tubercle, from the areole but far away from the axil. This species has been recently introduced rather frequently.

BOTANY.—*Notes on Peruvian Urticaceae of the Marshall Field exploration.*[1] ELLSWORTH P. KILLIP, U. S. National Museum.

During the course of biological exploration in Central and South America conducted recently by the Field Museum of Natural History through the generosity of Captain Marshall Field, extensive botanical collections have been made in Peru by Macbride and Featherstone in 1922 and by Macbride and Bryan in 1923. The material of several families has been shared with the United States National Museum, and the present paper is essentially a report upon the family Urticaceae.

The South American Urticaceae have received little critical attention since the publication of Weddell's treatment of the family in De Candolle's Prodromus.[2] Many of the species, particularly those of the

[1] BRITTON AND ROSE, *The Cactaceae* **3**: 83. 1922.

[1] Published by permission of the Secretary of the Smithsonian Institution.

[2] **16**[1]: 32–235. 1869.

genus *Pilea*, are of limited range, and study of these two collections, as well as of other Andean material recently received by the National Museum,[3] has proved of the greatest interest.

Urtica magellanica Poir. Lam. Encycl. **4**: 221. 1816.

Colombia to Chile.

Matucana, 2500 meters (174). La Oroya, 3700 meters (974).

Weddell's description of this is probably too inclusive, certain species which are cited in synonomy probably being distinct. These two Peruvian specimens seem to be typical *U. magellanica*.

Urtica ballotaefolia Wedd. Ann. Sci. Nat. III. Bot. **18**: 197. 1852.

Colombia, Peru.

In clumps at base of river cliffs, Llata, 2200 meters, August, 1922 (2268).

Recognized by its elongate androgynous spikes. A much coarser plant than the preceding.

Urtica macbridei Killip, sp. nov.

Plant herbaceous, about 1.5 meters high; stem erect, subquadrangular, sulcate, finely pilosulous or almost glabrous near base, armed with a few short, weak bristles, few-leaved, the internodes 6 to 20 cm. long; stipules in pairs, subreniform, 3 to 5 mm. long, 6 to 8 mm. wide, free to base, densely pilosulous; petioles 2 to 6 cm. long, slender, widely divaricate or sub-reflexed, pilosulous-tomentose; leaves cordate-ovate, large for the genus, 6 to 12 cm. long, 4 to 8 cm. wide, tapering to an obtuse or acutish acumen, crenate from base to apex, 5 to 7-nerved at base, reticulate-veined (nerves and veins prominent beneath, paler than rest of blade), the upper surface pilosulous on the nerves, marked with minute linear and punctiform cystoliths, bearing numerous short inconspicuous bristles, otherwise glabrous, the under surface densely appressed-brown hirsutulous on the nerves and veins; plants monoecious, the flower-spikes unisexual; staminate spikes borne at the upper nodes, 12 to 15 cm. long, finely pilosulous, sparingly armed with weak bristles, the flowers in dense, more or less contiguous glomerules 4 to 5 mm. thick; perianth segments ovate, about 1 mm. long, obtuse, concave, pilosulous without; stamens about 1.5 mm. long; pistillate spikes borne at the lower nodes, 3 to 3.5 cm. long, very slender, pilosulous and armed with weak bristles, the flowers in small, often contiguous glomerules 2 to 3 mm. thick; achenes ovate, 1 mm. long, compressed, glabrous.

Type in the herbarium of the Field Museum, no. 535353, collected at Muña, on the trail to Tambo de Vaca, Peru, altitude about 2400 meters, June 5 to 7, 1923, by J. F. Macbride (no. 4271). A specimen of this is also in the National Herbarium.

This species apparently has no close relatives in America. The long staminate spikes suggest *U. ballotaefolia* Wedd., but the inflorescences of *U. ballotaefolia* are androgynous while those of *U. macbridei* are unisexual. From *U. dioica* and the species that have been segregated from it, *U. macbridei* is at once distinguished by the shape of the leaves, length of the floral spikes, and general habit. *Urtica morifolia* Poir., of the Azores, is apparently the nearest relative of this new species.

[3] See KILLIP; *New Urticaceae from Colombia*. This JOURNAL **13**: 354-360. 1923.

Urera laciniata Wedd. Ann. Sci. Nat. III. Bot. **18**: 203. 1852.

Panama to Peru.

Sunny, gravelly river flat, Pozuzo, 600 meters, June, 1923, "about 6 ft. high" (4703). Sandy flat, La Merced, 600 meters, August, 1923, "Coarse perennial, or woody below, to 20 ft. high. Stalks 3–5, rarely fewer. Flowers white. Wounds from spines cause swelling." (5315).

Distinguished by its deeply laciniate leaves.

Urera baccifera (L.) Gaud. in Freyc. Voy. Bot. 497. 1826.

Mexico and West Indies to Peru and Brazil.

Muña, 2200 meters, May, 1923. "Tree-shrub. Inflorescence red, with stinging pubescence. Fruits white." (3910).

A common tree in tropical America, distinguished from other species of this genus by the large sinuate serrations of the leaves.

Pilea microphylla (L.) Liebm. Dansk. Vid. Selsk. Skrivt. V. **2**: 296. 1851.

Throughout tropical America.

Steep grass-shrub slopes, Piedra Grande, station near Rio Santo Domingo, 1600 meters, May, 1923 (3690).

A common plant in various habitats in the tropics, variable in size and habit. Leaves ovate or obovate. Many segregates have been proposed on slight differences.

Pilea thymifolia (H. B. K.) Blume, Mus. Bot. Lugd. Bat. **2**: 44. 1855.

Urtica thymifolia H. B. K. Nov. Gen. & Sp. **2**: 37. 1817.

Pilea globosa Wedd. Ann. Sci. Nat. III. Bot. **18**: 208. 1852.

Southern Colombia to Peru.

Rock-outcrop, Huanuco, 2200 meters, April, 1923 (3512). Huacachi, station near Muña, May, 1923 (3868, 4087). In shallow soil on sunny, sloping rocks, Matucana, 2500 meters, April–May, 1922 (447).

A plant with much the habit of the preceding, but with nearly orbicular leaves. The name *Pilea globosa* has generally been applied to this species because of the inappropriateness of the earlier name.

Pilea cordifolia Killip, sp. nov.

Slender, repent herb, leafy throughout, especially at the ends of the branches; stems villosulous; stipules ovate, 1 to 1.5 mm. long, about 1 mm. wide, obtuse, persistent; petioles slender, 1 to 2 mm. long; leaves cordate, up to 4 mm. long and 5 mm. wide, obtuse at apex, entire or slightly undulate and, when dry, often revolute at margin, inconspicuously 3-nerved, sparsely villosulous on both surfaces, completely covered with punctiform cystoliths, black when dry; plants monoecious; staminate flowers borne singly or in pairs in the axils of the leaves on slender peduncles 3 to 6 mm. long, the perianth segments narrowly ovate, 1.5 mm. long, concave, the stamens 1 mm. long; pistillate flowers borne in a 4 to 6-flowered umbel on a slender peduncle 2 to 3 mm. long, the perianth segments unequal, the middle ovate, 0.5 mm. long, the lateral minute; achene ovoid, 0.7 mm. long.

Type in the herbarium of the Field Museum, no. 535481, collected in mossy uplands, Tambo de Vaca, Peru, altitude about 4200 meters, June 10–24, 1923, by J. F. Macbride (no. 4395). A specimen of this collection is in the U. S. National Herbarium also.

This small plant has the general appearance of *P. microphylla* and *P. thymifolia*. The leaves, the shape of the cystoliths, and the pubescence distinguish it readily from these two species and their close relatives.

Pilea diversifolia Wedd. Ann. Sci. Nat. III. Bot. **18**: 212. 1852.

Peru.

In patch at edge of shady brook, Muña, 2200 meters, May 23–June, 1923 (3984).

A much branched herb, with small leaves, those of a node both dissimilar and unequal.

Pilea minutiflora Krause, Bot. Jahrb. Engler **37**: 529. 1906.

Peru (known hitherto only from the type locality, Huacapistana, Province of Tarma, Department of Junin).

Mossy ledges, Huariaca, 2900 meters, April, 1923, "Indians take as remedy to cause forgetfulness for unrequited love." (3126.)

This and the following species belong to the long-peduncled group of the section *Glabratae*. *Pilea minutiflora* is related to *P. anomala*. Wedd.

Pilea dauciodora Wedd. Ann. Sci. Nat. III. **18**: 223. 1852.

Costa Rica and West Indies to Peru, Bolivia, and Venezuela.

Wet bank, Huacachi, station near Muña, about 2000 meters, May, 1923 (4117).

Low creeping herb with leaves up to 3 cm. long.

Pilea delicatula Killip, sp. nov.

Plant slender, glabrous throughout, the stem repent, at length erect, 8 to 10 cm. high; stipules ovate, 1 to 1.5 mm. long, abruptly acuminate; petioles of a node unequal, the longer 4 to 8 mm. long, the shorter 2 to 5 mm.; leaves crowded near end of stem, those of a node similar and nearly equal, 1 to 1.5 cm. long, 0.5 to 1 cm. wide, acute, rounded or subcuneate at base, dentate-serrate (6 to 10 teeth on each side, imbricate toward apex, mucronate), 3-nerved (lateral nerves inconspicuous, barely reaching middle of blade), bearing on upper surface, mainly along nerves, a few minute linear cystoliths, on the under surface numerous inconspicuous punctiform cystoliths; plants apparently dioecious, the staminate not seen; pistillate flowers borne in globose glomerules 3 to 4 mm. in diameter, on peduncles 4 to 10 mm. long; perianth segments subequal, about 1 mm. long; achenes broadly ovate, about 1 mm. long and wide.

Type in the Field Museum, no. 535486, collected in a wet mossy wood, at Tambo de Vaca, Peru, altitude 4000 meters, June 10–24, 1923, by J. F. Macbride (no. 4400). A specimen of this collection is also in the U. S. National Herbarium.

Resembling *P. daucidora* Wedd. in size and habit *P. delicatula* differs in having larger and sharper teeth on the margin of the leaves, less numerous and less conspicuous cystoliths, which are punctiform, not linear, on the under surface of the leaves, and a more compact, globose inflorescence. This plant also resembles *P. lamioides*, a species of the short-peduncled group.

Pilea tarmensis Killip, sp. nov.

Erect herb, about 60 meters high, glabrous throughout; stem terete, striate, and woody below, subquadrangular and succulent above, leafy toward apex, naked below; stipules small, triangular-ovate, 2 to 3 mm. long, 2 mm. wide, obtuse; petioles 1 to 2 cm. long (or longer?), those of a node subequal or one a third longer than the other; leaves of a node subequal and similar, ovate-elliptic, 8 to 14 cm. long, 4 to 6 cm. wide, obtuse, auriculate at base, crenate-serrate from base to apex, 3-nerved (lateral nerves

extending to apex of blade), covered on both surfaces with yellowish fusiform, linear, and punctiform cystoliths, in addition finely black-punctate beneath; plants dioecious; staminate flowers in dense clusters in a diffuse, long-peduncled panicle (peduncle up to 5 cm. long), short-pediceled, the perianth segments ovate, 1 mm. long, mucronulate; pistillate inflorescence not seen.

Type in the herbarium of the Field Museum, no. 536847, collected among rocks in a sunny shrubby canyon, near Huacapistana, Province of Tarma, Peru, altitude about 2800 meters, September 8, 1923, by J. F. Macbride (no. 5822).

In the absence of pistillate plants it is difficult to determine the exact relationship of this species. Weddell's subdivision of both the section *Glabratae* and the section *Pubescentes* on the basis of the peduncles of pistillate inflorescence being longer or shorter than the subtending petioles is not wholly satisfactory. Probably this species is nearest *P. anomala* Wedd., though it differs in having broader leaves with obtuse apices and blunter teeth, and much denser flower clusters. Among the short-peduncled species it comes nearest *P. multiflora* (Poir.) Wedd.

Pilea macbridei Killip, sp. nov.

Plant about 1 meter high, glabrous throughout; stem woody, terete, nearly destitute of cystoliths, much branched above, the lower internodes 3.5 to 4 cm. long, those near the ends of the branches 1.5 to 2 cm.; stipules ovate, about 5 mm. long, 4 mm. wide, rounded at apex, soon deciduous; petioles 4 to 5 mm. long, geniculate near base, densely covered with linear cystoliths; leaves ovate or ovate-elliptic, 3 to 5 cm. long, 1.5 to 2.5 cm. wide, acuminate, shallowly cordate at base, serrate from base to apex (teeth averaging 2 mm. long), 3-nerved (nerves reaching the upper quarter of blade), faintly marked with fine linear cystoliths above, copiously covered with minute punctiform cystoliths and punctate with a few dark spots beneath, the upper surface very dark green, when dry, often yellow green along the nerves; plants monoecious; staminate heads cymose, about 5 mm. wide, borne 1 to 3 on slender peduncles 2 to 3.5 cm. long which arise in the axils of the upper leaves; perianth purple-tinged, its segments minute; pistillate heads few-flowered, about 4 mm. wide, borne in the axils of the lower leaves on peduncles 6 to 8 mm. long; perianth segments unequal, the middle ovate, 1.2 mm. long, cucullate, the lateral barely half as long; achenes broadly ovoid or nearly orbicular, 1 mm. long, punctulate.

Type in the Field Herbarium, no. 536217, collected at Villcabamba, hacienda on the Río Chinchao, Peru, altitude about 2800 meters, July 17–26, 1923, by J. F. Macbride (no. 5179).

The inflorescence of this plant resembles that of *P. elliptica* Hook. f., of Chile, and in Weddell's monograph, *P. macbridei* would key out close to *P. elliptica*. However, in general habit and shape and texture of the leaves the two species are very distinct.

Pilea marginata Wedd. Arch. Mus. Paris **9**: 238. 1856–57. Peru.

Rocky trail edge through montaña, Pampayacu, hacienda at mouth of Río Chinchao, about 1100 meters, July, 1923 (5086).

Herb, about 80 cm. high, the leaves coriaceous, minutely repand-serrulate along upper half of margins.

Pilea verrucosa Killip, sp. nov.

Shrub, about 1 meter high; stem terete and glabrous below, subquadrangular, ferruginous and verrucose above, the internodes about 2 cm. long; stipules small, orbicular, 2 mm. long; petioles of a node equal or one half as long as the other, 3 to 8 mm. long; leaves ovate or subrhombic, 2 to 3.5 cm. long, 1 to 2.5 cm. wide, acute, subauriculate and often slightly asymmetrical at base, crenate-serrate (about 15 serrations to a side), triplinerved (lateral nerves extending to upper quarter of blade), subcoriaceous, glabrous, bearing very minute punctiform cystoliths on both surfaces; plants monoecious; staminate flowers borne in much-branched, densely-flowered panicles 2.5 to 4 cm. long, in the axils of the upper leaves (common peduncles about 1 cm. long), subsessile, very small, barely 0.5 mm. long, the segments acute; pistillate flowers in sessile or subsessile, densely-flowered cymes in the axils of the middle leaves, the perianth segments subequal, 1 mm. long, concave; achenes ovoid, 1.2 mm. long, 0.6 mm. wide, narrowed toward apex.

Type in the Field Museum, no. 536240, collected at Villcabamba, hacienda on the Río Chinchao, Peru, altitude about 2800 meters, July 17–26, 1923, by J. F. Macbride (no. 5201).

In many respects this plant agrees with the description of *P. suffruticosa* Krause. Both are shrubs and the upper branches apparently have the same peculiar roughness. The leaves of *P. suffruticosa*, however, are ovate-elliptic, tapering to the base, 5 to 8 cm. long, and long-petioled, while in *P. verrucosa* the longest leaf present is but 3.5 cm. long, and the leaves are ovate and auriculate at the base. The staminate inflorescences of *P. suffruticosa* are only half as long as the leaves and the individual flowers are long-pedicellate. In *P. verrucosa* the staminate inflorescences fully equal the leaves and the flowers are subsessile.

Pilea orbiculata Killip, sp. nov.

Low succulent herb, glabrous throughout, the stem repent, rooting at nodes, the branches erect or suberect, simple, up to 15 cm. high, longitudinally marked with fusiform cystoliths; stipules broadly ovate, 2 mm. long, 1 mm. wide, obtuse, connate at base, persistent; leaves crowded near apex of plant, those of a pair similar and subequal, orbicular or broadly ovate-orbicular, 7 to 10 mm. long, 9 to 12 mm. wide (leaves near middle of stem 5 mm. long and wide), rounded or slightly narrowing at apex, rounded or truncate at base, mucronate-serrulate except at entire base, short-petioled (petioles 4 to 6 mm.), often cartilaginous-thickened at margin, inconspicuously 3-nerved, faintly marked on the upper surface with minute fusiform cystoliths, almost destitute of cystoliths beneath; plants dioecious, the staminate not seen; pistillate flowers borne in small, densely-flowered, sessile or subsessile cymes 2 to 5 mm. long, shorter than the subtending petioles; perianth exteriorly covered with linear cystoliths, the segments unequal, the middle segment ovate, 5 mm. long, the lateral segments less than half as long; achene ovoid, about 5 mm. long, compressed.

Type in the herbarium of the Field Museum, no. 534560, collected on mossy ledges, Chasqui, Peru, April 10, 1923, by J. F. Macbride (no. 3289).

The following points of difference are to be noted between this species and its nearest relative *P. pusilla* Krause, both of the short-peduncled group of the section *Glabratae*: *P. pusilla*—leaves crenate, cystoliths punctiform, petioles 8 to 12 mm. long; pistillate cymes on erect, slender peduncles, equaling or

slightly longer than petioles; achenes 1.2 mm. long; *P. orbiculata*—leaves mucronate-serrulate, cystoliths fusiform, petioles 4 to 6 mm. long; pistillate cymes sessile or subsessile, shorter than petioles; achenes 0.5 mm. long.

Pilea lamioides Wedd. Ann. Sci. Nat. III. Bot. **18**: 213. 1852.
Peru.
Rocky hillside, San Geronimo, Lima, about 150 meters, September, 1923 (5917).
Small plant, 5 to 10 cm. high, with the aspect of *Lamium purpureum*.

Pilea pulegifolia (Poir.) Wedd. Ann. Sci. Nat. III. Bot. **18**: 213. 1852.
Urtica pulegifolia Poir. Encycl. **4**: 224. 1816.
Peru.
Thickets, Chaglla, about 2800 meters, May, 1923 (3650).
Stem elongate, lax (?), much branched; leaves of a node similar but very unequal, the larger up to 2.5 cm. long; pistillate flowers in a loosely-flowered panicle about 8 mm. wide, the peduncles filiform, 1 to 1.5 cm. long; perianth-segments unequal, the lateral less than half as long as the middle segment; achenes suborbicular, 1 mm. long and wide, finely papillose.

The dimension of the leaves of Macbride's specimen is twice that given by Weddell in his description of *P. pulegifolia*, but in general habit, leaf shape, and cystolithic markings this specimen agrees well with Weddell's diagnosis. Weddell evidently saw only staminate plants, while Macbride's specimens are all pistillate.

DOUBTFUL SPECIMENS OF THE GENUS PILEA

No. 3770. Yanano, about 1800 meters, May, 1923. Coarse, erect herb, glabrous throughout, the leaves oblong-elliptic, up to 15 cm. long, 4 cm. wide, narrowing to a rather broad base (petioles stout, 2.5 mm. long).

This plant is nearest *P. goudotiana* Wedd., a species cultivated in Colombia, known to me only by description. In Macbride's specimen, the inflorescence, probably pistillate, is not in a condition for satisfactory determination of the plant.

No. 4826. Cushi, about 1600 meters, June, 1923. Erect succulent perennial herb, "4 feet" high; leaves long-petioled, oblong-elliptic, up to 16 cm. long, 6 cm. wide; inflorescence undeveloped.

Nearest *P. spruceana* Wedd., but larger in every way.

Boehmeria aspera Wedd. Arch. Mus. Paris **9**: 349, *pl. 11, f. 24–28*. 1856–57.
Colombia, Peru.
Steep, grass-shrub slopes, Piedra Grande, station near Río Santo Domingo, May, 1923 "Shrub 2–5 feet" (3698).
Readily recognized by its coriaceous, bullate-rugose, lanceolate leaves.

Boehmeria pavonii Wedd. Ann. Sci. Nat. IV. **1**: 202. 1854.
Peru and Bolivia.
La Merced, about 600 meters, August, 1923. "Slender open shrub-tree" (5268).

Leaves long-acuminate, the alternate ones often dimorphic; flowers clusters small for the genus.

Boehmeria weddelliana Killip, nom. nov.

Boehmeria hirta Wedd. Ann. Sci. Nat. IV. 1: 202. 1854, not *Boehmeria hirta* Pers. (1807).

Peru.

Sunny stream edge, Muña, about 2200 meters, May-June, 1923. "Compact 5 ft. shrub" (4012).

This is apparently the only South American species of *Boehmeria* with both axillary flower clusters and opposite leaves. The plant is densely hirsute throughout.

Pouzolzia aspera Wedd. in DC. Prodr. 16¹: 233. 1869.

Peru and Bolivia.

Steep grassy, rocky slope, canyon of the Río Huallaga, below Río Santo Domingo, about 1200 meters, June, 1923, "Dense 2–3 ft. shrub" (4238).

Leaves lanceolate, entire, rough above, cano-tomentose beneath.

Myriocarpa densiflora Benth. Bot. Voy. Sulphur 169. 1844.

Colombia to Bolivia and Peru.

Forest, Cushi, about 1600 meters, June, 1923, "Rather open 10 ft. shrub-tree" (4838).

A second specimen, collected at La Merced, about 600 meters altitude, August, 1923 (5454), with larger leaves rugose above, and more densely tomentose, is the subspecies *dombeyana* Wedd.

The differences between *Myriocarpa densiflora* and *M. stipitata*, described at the same time by Bentham, are very slight, and the two may not be distinct. In such case the latter name must be used, but in the absence of type material or authenticated specimens it does not seem advisable at this time to treat them as conspecific.

Myriocarpa laevigata Killip, sp. nov.

Compact tree or shrub, up to 5 meters high, glabrous, except inflorescence, petioles, and tips of branches, the bark of the younger branches cinerous; stipules ovate-lanceolate, 6 to 8 mm. long, 4 to 5 mm. wide, acutish; petioles up to 5 cm. long, canaliculate, appressed-pilosulous or nearly glabrous; leaves obovate or ovate, 7 to 14 cm. long, 4 to 8 cm. wide, abruptly acuminate or acute at apex, subcuneate or rounded at base, shallowly undulate-serrulate above middle, subentire in lower half, triplinerved with 3 or 4 ascending secondary nerves on each side of the mid-nerve, reticulate-veined, coriaceous, glabrous above, beneath often densely pilose in the axils of the principal and secondary nerves, and sparsely pilosulous along midrib, otherwise glabrous, densely covered on both surfaces with fusiform and punctiform cystoliths, the nerves on under surface bearing longer, linear cystoliths; plants dioecious (?); staminate plants not seen; pistillate inflorescences solitary or in pairs in the axils of the leaves, twice dichotomous, the branches slender, wiry, pilosulous, 5 to 8 mm. long, the primary branches slightly shorter, the ultimate elongate, 10 to 15 cm. long, averaging 3 mm. thick; sepals 2, about 0.5 mm. long, recurved, glabrous; achene ovate-elliptic, stipitate, about 1.5 mm. long (including stipe), compressed, slightly hispidulous, setose at margin (setae subequal), the body dark brown, the stipe pale.

Type in the herbarium of the Field Museum, no. 534987, collected at Muña Peru, altitude about 2300 meters, May 23 to June 4, 1923, by J. F. Macbride (no. 3925). A specimen of this collection is also in the National Herbarium.

Additional specimens examined:

PERU: Yanano, about 1800 meters, *Macbride* 3783. Cueva Grande, near Pozuzo, about 1100 meters, *Macbride* 4811.

The smooth, coriaceous, nearly entire leaves distinguish this from the other Peruvian species of *Myriocarpa*. The foliage more nearly resembles that of *M. heterostachys* Donn. Smith, a plant of Guatemala, though in that species the leaves are rather long-attenuate at the apex, thinner, and the cystolithic markings are different.

Phenax hirtus minor Wedd. in DC. Prodr. 16^1: 235^{39}. 1869.

Phenax urticaefolius minor Wedd. Arch. Mus. Paris **9**: 496. 1856–57.

Peru.

Shrubby canyon side, Matucana, about 2500 meters, March, 1923, "Loosely branched shrub, about 4 ft. Flowers pink" (2883). Brook margin, Matucana, April–May, 1922, "Woody below. Leaves glossy above." (233.)

Leaves only 1.5 to 3 cm. long; otherwise apparently the same as typical *P. hirtus* Sw., a common tropical plant.

Phenax laevigatus Wedd. Ann. Sci. Nat. IV. Bot. **4**: 192. 1854.

Colombia to Peru.

Stream-canyon thicket, Mito, about 2700 meters, July, 1922, "To 4 ft., erect; branches spreading, 'spray-like'" (1503). Huacachi, station near Muña, 2000 meters, May, 1923 (4153).

Leaves coriaceous, glabrous except, occasionally, on the nerves beneath.

Phenax laxiflorus Wedd. Arch. Mus. Paris **9**: 499. 1856–57.

Peru.

Muña, along trial to Tambo de Vaca, about 2500 meters, June, 1923 (4282).

Readily recognized by the loosely-flowered clusters. Usually more densely pubescent than the other Peruvian species of *Phenax*.

Parietaria debilis Forst. Fl. Ins. Austr. Prodr. 73. 1786.

Widely distributed in both hemispheres, from sea level to high altitudes.

In moist soil on rock ledges of canyon, Matucana, about 2500 meters, April–May, 1922, "Stems clinging to face of rock," (262). Upper slopes of seaside hills, Chorrillos, near Lima, September, 1923 (5870). Sandy loams along the sea, Turin, Lima, about 60 meters, September, 1923 (5968).

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

THE PHILOSOPHICAL SOCIETY

909TH MEETING

The 909th meeting was held at the Cosmos Club Saturday, November 29, 1924, with President HAZARD in the chair and 55 persons in attendance.

Program: W. W. COBLENTZ: *The measurement of planetary temperatures.* (Illustrated.)

Author's abstract: In 1921 a new method was used at the Lowell Observatory, Flagstaff, Arizona, for determining the temperature of stars. The novelty of the method consisted in separating the radiation into spectral components by means of transmission screens, and measuring the energy by means of stellar thermocouples similar to those used at the Lick Observatory, Mt. Hamilton, California, in 1914.

The results obtained were so promising that in 1922 the Lowell Observatory provided financial means for testing the device on the planets, preliminary to the crucial work at the opposition of Mars in 1924. Unfortunately, owing to eye-strain, only a few nights could be devoted to the tests. However, the results were entirely successful, indicating that the equatorial temperature of Mars was high, perhaps 10° to 20°C.

In estimating planetary temperatures the usual procedure is to consider the intensity of insolation on the planet, the albedo of the planet, and various other factors. The measurements, which were made in 1922, showed that while the water cell is an excellent means for testing the presence of planetary radiation, it was desirable to try out a new method which would permit the correlation of the spectral distribution of the planetary radiation with that of a black body radiator. This is possible by separating the planetary radiation into spectral components by means of transmission screens as used in 1921.

The outstanding features of this investigation are the results of the measurements on selected regions on the surface of Venus and of Mars. The surface of the former planet is hidden by clouds, and its period of rotation is undetermined. Hence, the thermocouple radiometer appears to be a means of obtaining further information on this question.

It was found that not only does the illuminated crescent show the presence of considerable planetary radiation, but the unilluminated part of the disk also emits a large amount of infra red rays. This raises the question whether the radiation from the dark side of the planet is owing to a rapid rotation, say 1 to 10 days.

Radiometric measurements were made on Mars on 24 nights under a wide range of instrumental and meteorological conditions. These measurements show that the bright regions of Mars are cooler than the dark regions, that the sunrise side of the planet is at a lower temperature than the side exposed to the afternoon sun, and that the polar regions are intensely cold.

An estimate of the temperature of the irradiated equatorial surface of Mars was obtained by four methods, as follows: (1) By comparison with terrestrial conditions, Martian temperatures similar to those found on the Earth were inferred; (2) By direct comparison of the spectral components of the planetary radiation from Mars and the Moon, noonday temperatures were obtained ranging from 5°C. for the bright equatorial region to 20°C. for the adjacent dark regions; (3) By comparison of the observed spectral components of the planetary radiation from Mars with similar data calculated from the laws of spectral radiation of a black body, temperatures were obtained ranging from −15°C. for the bright equatorial regions to 12°C. for the adjoining dark regions; and (4) By applying the fourth-power law of total radiation to the water-cell transmissions of isolated regions, temperatures up to 15°C. were calculated.

As a whole, these temperature estimates are in harmony with visual observations on Mars. The measurements show that the noonday temperature of the equatorial surface of Mars at perihelion is not unlike that of a cool bright day on the Earth, with temperatures ranging from 5° to 15°C., or 40° to 60°F.

The temperature estimates of the other planets are as follows: Mercury 75 to 100°C.; the upper limiting temperatures of the outer atmospheres of Venus, Jupiter, Saturn, and Uranus, −60°, −75°, −65°, and −75°C. respectively; and the unilluminated face of the Moon −75°C. to −200°C.

W. D. COLLINS: *Temperatures of air and water.* The paper was illustrated with lantern slides and diagrams, and was discussed by Messrs. SOSMAN, HUMPHREYS, and L. H. ADAMS.

Author's abstract: The large number of published measurements of earth temperatures throughout the world indicate that at depths of from 30 to 60 feet the temperature at any place is practically constant throughout the year. Computations by C. E. Van Orstrand from many temperature measurements at different depths lead to the conclusion that in general this constant temperature is about 2°F. higher than the mean annual air temperature at the same place. A number of different results have been published for the rate of increase of temperature with depth. A committee of the British Association for the Advancement of Science reported in 1882 the selection of 1°F. for 64 feet of depth as the most probable average rate. Thus from the air temperature it is possible to estimate closely the probable temperature of water obtainable from wells of any depth.

Measurements of surface water temperatures at 23 places in the United States, published in United States Geological Survey Water-Supply Paper 520-f, show a reasonably close agreement between the mean monthly water temperature and the mean monthly air temperature. In the warmer months the agreement is somewhat better than in winter. The mean monthly air temperature at any place may be taken as the approximate temperature of surface water during the month, but the agreement with the actual temperature is not likely to be as close as the agreement between the calculated and actual temperature of ground water.

910TH MEETING

The 910th meeting, being the 54th annual meeting, was held at the Cosmos Club Saturday, December 13, 1924, with President HAZARD in the chair and 35 persons present.

The report of the Treasurer showed total receipts, $2015.12; disbursements, $1074.04, leaving a balance of $941.08. The report of the Secretaries showed that 18 meetings were held during the year, several in conjunction with other societies.

The following officers were elected for the ensuing year: *President,* J. A. FLEMING; *Vice-presidents,* J. P. AULT and W. BOWIE; *Treasurer,* P. R. HEYL; *Recording Secretary,* H. A. MARMER; *Members-at-Large, General Committee,* L. B. TUCKERMAN and H.E. MERWIN.

Regular program: N. H. HECK: *Application of force diagrams to compass compensation.* The paper was illustrated with lantern slides and was discussed by Messrs. CURTIS, HAWKESWORTH, PAWLING, FRENCH, and AULT.

Author's abstract: Mariners of the Middle Ages did not recognize the need for compass compensation, but with the arrival of the iron steamship, about 1850, and later the steel ship, the matter became of great importance. History is cited to explain why this old subject is revived. Early investigators developed a mathematical solution which was improved by the British Navy and by Diehl and Muir for the American Navy. About 1910 there was a reaction against the mathematical treatment for several reasons, including: Realization that sub-permanent magnetism of a ship does not change according to fixed laws and may be affected by electrical machinery; magnetic observations at sea by the Coast and Geodetic Survey showed that variations in ships' magnetism made it difficult to get accurate observations and this led to the use by the Carnegie Institution of the "Galilee," and the building of the "Carnegie," a non-magnetic ship; the use of the gyro compass on large

vessels has removed some of the more difficult problems. A reaction accordingly followed and recent manuals give a very simple treatment, in some cases the efforts to simplify lead to fallacies. This paper describes a relatively simple treatment which is intended to give a picture of the forces involved.

The old method described nine bars as representing the ship's magnetism; in any case, all the forces at the compass center can be resolved into components in three directions, but this statement presents no picture that can be visualized.

Starting with an iron filing diagram of a bar magnet, the directions of forces at points in the field corresponding to that of the compass aboard the ship are indicated. Magnetism of the ship is considered as represented by three magnets symmetrically placed with respect to the ship, there being two such sets of magnets, one for permanent and one for temporary magnetism.

Permanent magnetism. The forces due to the three magnets can be readily visualized, and the simple force diagram gives the resultant direction of the compass needle, taking into account the Earth's field.

Temporary magnetism. This is a little more difficult to visualize. By means of iron filing diagrams due to a soft iron bar making different angles with a uniform field, it is seen that the field of the bar may be considered as identical in form with that of a magnet of the same shape, but that the force in the field changes with the direction of the bar, becoming zero when at right angles to the direction of the uniform field. A simple force diagram shows how the force normal to the meridian which causes the deviation may be represented. From this an extremely simple diagram is developed for showing the variation of this force with the heading of the vessel.

Compensation is briefly discussed, and the action of the spheres in compensating temporary magnetism is demonstrated.

The application of this method, and discussion of the heeling error affords a test of its value.

J. P. AULT, *Recording Secretary.*

THE BIOLOGICAL SOCIETY

669TH MEETING

The 669th meeting of the Biological Society was held in the lecture hall of the Cosmos Club, October 25, 1924, at 8:10 p.m., with President GIDLEY in the chair and 72 persons present.

F. C. LINCOLN reported that the Authors' Index to the Proceedings of the Biological Society had been issued, and exhibited copies.

S. F. BLAKE reported that during the past summer he had observed in Connecticut a small snapping turtle which, when irritated by a stick, slowly raised the posterior portion of its body and then jumped forward about an inch, at the same time shooting out its head.

Program: VERNON BAILEY: *Recent observations in Glacier National Park* (illustrated). The speaker compared the present numbers of the animals in the park with observations made some years ago. Careful estimates of the numbers of the larger animals in the park made by park officials for several years provide a basis for future determination of increase or decrease, but unfortunately there are few data for comparison from past years. From his study of animal life in the park in 1917 and 1918, the speaker is confident that there has been a noticeable increase in mountain goat, bighorn and deer,

a slight increase in elk and moose, and a notable decrease in predatory animals, such as coyotes, wolves, and mountain lions. With reasonable control of these harmful species, the wild life of the park should go on increasing until there is a constant overflow into surrounding country, much of which is well adapted to game.

One of the most delightful features of the animal life in the park is its tameness. White goats, bighorns, and deer are easily photographed at close range, and the great hoary marmots, Columbia ground squirrels, and chipmunks would often take food from the hand. Beaver, porcupines, snowshoe rabbits, squirrels, martens, mink, weasels, and conies were often seen at close range, and the birds of the park were equally confident and unafraid. Colored lantern slides were shown of some of the wildflower gardens and picturesque scenery of the park, as well as of many of the mammals and a few of the birds.

P. J. BALDENSPERGER, Nice, France: *Palestine and its fauna* (illustrated). The speaker described the country and its inhabitants, and illustrated both the scenery and the people with numerous lantern slides, many of which showed places of religious interest. Mention was made of some of the more important birds and animals, and the decrease in wild life which has followed the deforestation of the country during the war was particularly emphasized. In conclusion the speaker, who is a practical bee-keeper, showed views of the bee hives used in Palestine and described some of his experiences with bees.

670TH MEETING

The 670th meeting was held November 8, 1924, at 8 p.m., with President GIDLEY in the chair and 53 persons present.

L. O. HOWARD read the following resolution regarding the recent death of NED HOLLISTER, an ex-president of the Biological Society:

> WHEREAS, the Biological Society of Washington has learned with profound regret of the death of one of its ex-presidents Ned Hollister, Superintendent of the National Zoological Park, therefore be it
>
> *Resolved* that this Society place on record an expression of the deep loss that it has suffered through the death of a most valued member, former editor and president; and of its appreciation of his ability as a zoologist, and especially of his character and worth as a man,
>
> *Resolved*, further, that a copy of this resolution be spread upon the minutes of the Society and that a copy be transmitted by the secretary to the bereaved family.—L. O. HOWARD, T. S. PALMER, H. C. OBERHOLSER, COMMITTEE.

H. C. OBERHOLSER spoke of Mr. HOLLISTER's work as editor of the "Journal of Mammalogy" and of the educational work he accomplished as director of the National Zoological Park, as well as of his worth as a man.

T. H. SCHEFFER, Biological Survey: *Mountain beavers and moles in the Puget Sound country* (illustrated).—The peculiar little animal called the mountain beaver (*Aplodontia*) is to be found only on the Pacific coast of North America. It resembles a tailless muskrat in size and general appearance, but is not aquatic. It is particularly abundant in the edges of the forests and on the old burns and cut-over lands of the Puget Sound country, where it burrows extensively among the stumps and logs and in the slopes of the many gulches that dissect the bench lands. The food of the mountain beaver includes a great variety of herbs, and cuttings of both deciduous and evergreen trees, shrubs, and vines. The animal is not arboreal in habit, but readily climbs shrubs and saplings to a height of several feet, cutting off the small branches and leaving short stubs to serve as the rounds of its ladder. Small

piles of the green stuff it uses for food are cached temporarily at the entrances of its burrows, or in exposed situations where they are sometimes left to dry. The animal is active throughout the year. Skins of the mountain beaver were used by the Indians for making garments and robes, but have not been utilized by our modern furriers.

Of the two species of mole to be found in our Pacific Coast States, the Townsend mole (*Scapanus townsendi*) is the largest on the continent and is more abundant locally than any species occurring elsewhere. This abundance is due, in a large degree, to the fertile, well watered soil of the Northwest Coast, which teems with earthworms, the principal food of the mole. The Townsend mole burrows more deeply than the eastern mole and heaps up unsightly mounds of earth in fields, parks, and on lawns. From the standpoint of food habits it is more or less neutral in its effects on our interests, but becomes an intolerable nuisance in gardens, parks, lawns, and meadows, because of its burrowing habits. The animal may be readily controlled by the use of properly constructed traps, but by no other practicable method. The fur of the Townsend mole is of excellent quality and is coming into use in the trade. The skins are larger than those imported from Europe as Scotch mole and Dutch mole. (*Author's abstract.*)

G. A. DEAN, Bureau of Entomology: *The European corn borer in America* (illustrated).—The European corn borer (*Pyrausta nubilalis* Hübner), now firmly established in the United States and Canada, probably gained entrance into America in 1909 or 1910 in broom corn imported from Hungary and Italy, but was first reported in the United States in 1917, from near Boston. In 1919 it was discovered in New York and northwestern Pennsylvania, and in 1920 it was reported from Ontario. In 1921 a slight infestation was found throughout a narrow strip of territory bordering on Lake Erie in Pennsylvania, Ohio, and Michigan. The survey for 1924 has disclosed increases of 150 to 300 per cent in areas infested in Ohio, Michigan, and Pennsylvania. New areas have been found in Staten Island, Long Island and Connecticut.

In Canada, the principal dent corn growing areas in Essex and Kent Counties, Ontario, are now so seriously infested as to cause considerable commercial injury. The prevalence of moisture, heavy dews, and high humidity during the incubation of the eggs and during the early or first instar stage of the larvae in 1924 apparently caused very little mortality of the eggs and permitted large numbers of the larvae to become established in the tassels, leaves, stalks, and ears of the corn plants.

In Massachusetts there has been not only a very marked decrease in the intensity of infestation, but also very little spread in the infestation. This decrease apparently is due principally to the adverse climatic conditions which prevailed during the summer of 1923. The thorough clean-up of fields, gardens, and small weed areas and the fall plowing of practically 90 per cent of the cultivated fields probably also contributed considerably to the decrease in the infestation. In eastern New York the infestation remains about the same, that is, there has been very little spread and very little increase in the intensity of the infestation.

Since the insect in the short time that it has been found in America has been found infesting nearly two hundred species of plants, including many valuable garden and farm crops, it is considered an insect of major importance. Entomologists and agronomists are convinced of its tremendous potentiality and of what may be expected when it once becomes established throughout the corn belt and has the benefit of one or two years of favorable climatic conditions. (*Author's abstract.*)

F. C. LINCOLN, Biological Survey: *Results of bird banding in Europe* (illustrated).—Bird banding in Europe has been practiced since 1899 when the first experimental work was done by Prof. H. C. C. Mortensen of Viborg, Denmark, followed by organized investigations in Germany, Holland, Hungary, Sweden, Scotland, and England.

The records available trace the migration of the White Stork (*Ciconia ciconia*) south through the valleys of the Elbe and Oder Rivers, across the Carpathian Mountains, Asia Minor, and Syria to the delta of the Nile River. This stream is then followed to its headwaters and on south to the Transvaal, Orange Free State and Cape Colony where the birds spend the winter. Another route is to the southwest through the valley of the Rhone River to the Mediterranean coasts of France and Spain and also to Morocco. It is not believed that the flight by this route (which is obviously of lesser importance) is continued much south of the African coast as the stork evidently dislikes the long flights which would be necessary to cross the Sahara Desert. A few young birds have returned in later years to within a short distance of their original home. The oldest bird, as revealed by banded birds, was eleven years old when killed.

The Pintail (*Dafila a. acuta*) breeds in northern Europe, and a large number were banded by Prof. Mortensen at the island of Fano, off the west coast of Denmark. Many of these were subsequently recovered, some as far north as Lapland, Finland, and the coast of the White Sea. The winter range is shown to extend south through the valley of the Rhine River and along the Bay of Biscay to the northern shores of the Mediterranean and Adriatic seas. One bird was taken far in the interior, east of the Ural Mountains.

Professor Mortensen also banded a large number of European Teal (*Nettion crecca*), another duck breeding to about 70° north. The winter quarters are confined largely to the regions included between the isotherms of 4° and 6°C. for January. These areas include almost all of Ireland, the south and west coasts of England, the western part of France between the Loire and Gironde Rivers, northern Italy and Jugo-Slavia. The fall migration to winter quarters is probably via the coastwise route.

The Black-headed Gull (*Larus ridibundus*) breeds throughout Europe and Asia to Kamchatka, but the birds banded were mainly from colonies along the Baltic coasts and in Hungary. The fall migration of these birds follows the coast line south to the Mediterranean Sea, a few crossing to the African coast. From this main route there are several offshoots, the principal river valleys being followed by different quotas. At times cross-country flights of considerable length are undertaken and several ranges of mountains are regularly crossed. Two gulls, banded at the German station of Rossitten on the Baltic Sea, have been recovered in American waters; one near Bridgetown, island of Barbados, British West Indies, and the other near Vera Cruz, Bay of Campeche, Mexico.

European Swallows (*Hirundo r. rustica*) have yielded a few interesting returns. Seven birds banded in England were recovered in South Africa, over 7,000 miles from the point of banding. Six of these were young birds in their first season. The route taken is not definitely indicated. Fifteen Hungarian birds returned to the point of banding, two yielding three successive returns each. Corroborative evidence of the strength of the homing instinct in these birds is furnished by records from England and Scotland.

671ST MEETING

The 671st meeting was held November 22, 1924, at 8:00 p.m., with President GIDLEY in the chair and 98 persons present. New members elected: Dr. ALBERT L. BARROWS, C. S. EAST, ARTHUR LOVERIDGE.

T. S. PALMER gave a report of the recent A. O. U. meeting at Pittsburgh, referring especially to the moving pictures of birds and exhibition of bird paintings. He also reported that one of his box turtles, after going into hibernation in October, had appeared again but was not active. S. F. BLAKE stated that a small Bell's turtle which he had in captivity had reappeared from the mud during the warm days in early November, but had gone into the mud again at the time of the cold spell.

VERNON BAILEY commented on the delicious quality of some wild rice received from C. E. CHAMBLISS, and discussed the hibernation of certain mammals.

M. K. BRADY exhibited some living specimens of two rare Japanese salamanders, and commented on their characters.

S. F. BLAKE reported that the series of books containing the minutes of the Council meetings of the Society is now complete, but that the first book of minutes for the open meetings has not been found.

A. WETMORE reported that a hen pheasant appeared in his yard at Takoma Park on November 9.

JOSEPH GRINNELL: *Faunal changes now taking place in California.*—The paper covers the faunal changes that have taken place since the coming of the white man to California. The principal factors controlling the number of animals are food supply, temporary refuges (cover), proper breeding places, and suitable climate. All these factors of the environment are affected by the following modifications, due to man: deforestation, afforestation, clearing of brush land, irrigation, cultivation of grassy plains, drainage of lakes and swamps, formation of reservoirs and canals, and grazing. As a result of these modifications, some species have been reduced in numbers, some have increased (linnet), some have been exterminated (kit fox, last recorded in 1903), and some have been added from adjacent territory (bobolink). Irrigation has undoubtedly increased the number of individuals, but the species are fewer, owing to the extermination of many.

In the Imperial Valley, where the Colorado River was diverted from its course, the introduction of water into desert areas has brought with it the cotton rat, muskrat, and Bermuda grass, the last closely followed by the pocket gopher. Some desert rodents have been eliminated in the flooded regions. Examples of extermination are afforded by several rodents of very local distribution inhabiting regions where the environment has been greatly changed by the advent of man.

New arrivals are the opposum, which was introduced by negro caterers at San Jose in 1910 and is now found abundantly in the lowlands from Sacramento to Riverside, and the roof rat (*Rattus alexandrinus*), which is making its way along streams into remote places in the mountains.

In discussion, T. S. PALMER stated that the important date in a study of changed conditions in California is that of the coming of railroads. In reply, Dr. Grinnell stated that he considered the introduction of automobiles of more importance in changing wild conditions. A. WETMORE, commenting on Dr. Grinnell's statement that the eucalyptus groves in California were practically devoid of wild life, stated that he had found conditions much the same in the eucalyptus groves of Argentina. Almost the only native bird that inhabits

them there is a parrakeet, which builds very large nests. A species of teal lays its eggs in the nests built by the parrakeet. Within five miles of Montevideo the only conspicuous plants and birds were all introduced—eucalyptus, tamarix, and the English sparrow.

The paper was also discussed by M. K. BRADY and J. W. GIDLEY, who referred to the destructive effects of grazing in the northwestern states.

H. V. HARLAN: *The plains and hills of the Punjab and Kashmir* (illustrated). —Central and northwest India are regions of low rainfall. Much of the Punjab is desert. In the drier sections of the Punjab several million acres have recently been brought under irrigation. Cotton and wheat are the basic crops. The Mogul dynasty did much to promote horticulture and there are still remains of their work visible in the gardens of the tombs of several of their emperors.

The Vale of Kashmir is a picturesque horticultural valley. The characteristic trees of the valley are oriental plane, mulberry, white-barked poplar, and willow. Berries, apricots, apples, and grapes are grown extensively. The grain crops are rice, wheat, barley, and corn. There are remains of eleven Mogul gardens several of which are still in good condition. They usually contain plane trees several centuries old. The irrigation systems are the original ones installed by the Moguls. Market gardens are grown in beds of turf floated on shallow lakes. (*Author's abstract.*)

672D MEETING

The 672d regular and 45th annual meeting of the Biological Society was held in the lecture hall of the Cosmos Club December 6, 1924, at 8:15 p.m., with President GIDLEY in the chair and 22 persons present. The Annual Reports of the Corresponding Secretary, Recording Secretary, Treasurer, and Committee on Publications were read. The following officers were then elected: *President*, S. A. ROHWER; *Vice Presidents*, H. C. OBERHOLSER, E. A. GOLDMAN, A. WETMORE, C. E. CHAMBLISS; *Recording Secretary*, S. F. BLAKE; *Corresponding Secretary*, T. E. SNYDER; *Treasurer*, F. C. LINCOLN; *Members of Council*, H. H. T. JACKSON, H. C. FULLER, W. R. MAXON, C. W. STILES, A. A. DOOLITTLE. The President-elect was nominated as Vice-President of the Washington Academy of Sciences to represent the Biological Society.

S. F. BLAKE, *Recording Secretary.*

SCIENTIFIC NOTES AND NEWS

ALDEN SAMPSON, formerly a game preserve expert with the Biological Survey, died in New York City January 5. Mr. Sampson was widely known as an explorer and traveler. He was a member of the Biological and Archaeological Societies.

DR. ALES HRDLICKA was recently elected President of the American Anthropological Society, succeeding DR. WALTER HOUGH.

The National Museum has received important ethnological, zoological and botanical material from the National Geographic Society, obtained by the Society's recent expedition to China, headed by F. R. WULSIN.